Data Communications Test Library

HP 4957A Protocol Analyzer

Notice

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This application can be used with both the HP 4957A Protocol Analyzer and the HP 4952A Protocol Analyzer. The User's Guide refers to the HP 4952A in the operating procedures but operation is the same on the HP 4957A.

Contents

Printing History

New editions are complete revisions of the manual. Update packages are issued between editions. They contain additional and replacement pages to be merged into the manual by the customer. The dates on the title page change only when a new edition or a new update is published. No information is incorporated into a reprinting unless it appears as a prior update. The edition does not change when an update is incorporated.

Many product updates and fixes do not require manual changes and, conversely, manual corrections may be done without accompanying product changes. Therefore, do not expect a one-to-one correlation between product updates and manual updates.

Edition 1.. July 1989

Problems? Call for Help

If you have problems operating your HP protocol analyzer or any of the applications, call the CTD Customer HelpLine or use your fax machine to send your questions.

HelpLine - (719) 531-4567
Fax - (719) 531-4505

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Product Introduction

This package of tests is intended to help you easily apply the power of Hewlett-Packard's protocol analyzers in the solution of common data communication problems. They also provide examples and starting points for you to develop custom tests. The Data Communications Test Library programs are written entirely in HP 4951C Monitor or Simulate menus. They work with the HP 4951C and HP 4952A in Asynchronous, Synchronous, SDLC/HDLC, X.25, and other environments.

This section presents a list of the programs with brief descriptions, grouped by application. A more detailed description of each program, with instructions for use and program results, is in the final section (Section 3) of this manual. It is highly recommended that a copy of the master disc be made. Instructions for copying the master disc, as well as loading, storing, modifying, and printing programs are in Section 2.

Looking up a Program

All programs in this collection use the file name format defined below to aid in locating a desired program on a disc. The first letter of the file name indicates the program application listed in the following table.

A   General purpose asynchronous monitor programs
B   General purpose asynchronous simulate programs
C   Async terminal tests
D   Async printer tests
E   Test devices sending to async printers
F   Test async devices across a modem link
I   Interface tests (level 1)
S   SDLC tests
U   Instrument setups
X   X.25 tests

All tests are stored on disc with a comment field that briefly describes the test.

Using a Program

If you are not yet familiar with your HP protocol analyzer, instructions for loading programs are presented in the next section. Hewlett-Packard recommends that you make a working copy of your master disc, also covered in Section 2, and then store the master disc in a safe place. Because all programs in the Data Communications Test Library are standard menus, they can be infinitely copied and easily modified for your particular needs. Note that any "Load Menus" or "Store Menus" operation involves Monitor, Simulate, Setup, and Run Menus.

Data Communications Configuration (Protocol Analyzer Setup)

For consistency and simplicity, all programs in this library are stored with a common set of data communication parameters that are loaded into the analyzer when you load the program These parameters may be easily changed in the Setup Menu to suit your system. Refer to the Operating Manual for your Hewlett-Packard protocol analyzer for guidance.

Note   Changing some parameters, such as Code, Mode, or Character Framing, ma require corresponding changes to the Monitor or Simulate menus. Programs modified to take advantage of unique HP 4952A program features may not run on the HP 4951C.

The parameters loaded with all library programs (except interface tests) are as follows:

9600 bps line speed
ASCII-7, Odd parity for async
EBCDIC, DCE supplies DTE clock for SDLC
ASCII-8, DCE supplies DTE clock for X.25/HDLC

The parameters loaded for interface tests are as follows:

2400 bps line speed
ASCII-8, no parity

Data Communications Test Library

Program List

Program Name	Program Purpose
	General purpose async monitor
A_COUNTCHR	Count DTE and DCE characters for 1 min
A_COUNTPAR	Count DTE and DCE parity errors for 1 min
	General purpose async simulate
B_ASC7EVER	Send ASCII7 even parity errored string
B_ASC7ODER	Send ASCII7 odd parity errored string
B_AUTOBAUD	Find terminal's or printer's bit rate
B_BRBRPOLE	Send 81 char with Xon/off and DTR -continuous
B_BRBRPOLS	Send 81 char with Xon/off and DTR - 4 pages
B_FOXFLOW	Send QBFox with Xon/off and DTR - continuous
	Async terminal tests
C_ALGNMNT	Send "cross-hair in square" pattern for alignment
C_RESPTIME	Measure avg & instant response time CR - prompt
	Async printer tests
D_BUFFER	Determine printer's buffer characteristics
D_DTR	Exercise printer with DTR flow control
D_XONXOFF	Exercise printer with Xon-Xoff flow control
	Test devices sending to async printers
E_DTRFLOW	Exercise device sending to printer - DTR
	Exercise device sending to printer - Xon/off

Test async devices across a modem link

F_BRBRPOLS   Send 4 pages 81 char with Xon/off & CTS modem link
F_BUFFER   Determine printer's buffer character modem link

Interface tests

I_AVRTSCTS   Measure average RTS-CTS time - 10 intervals
I_AVTURND   Average remote turn-around time -RTS-CD
I_CDOFF   Check for CD off while receiving data
I_CD_TO_RD   CD on to received data time
I_CD_TO_TD   CD off to transmitted data time
I_CTSTD   CTS on to transmitted data time
I_CTS_ERR   Check for CTS off before RTS off
I_DSR_DTR   Detect transitions and glitches on DSR & DTR
I_LCLTURND   Local turn-around time CD off to RTS on
I_RMT_TRND   RTS off to CD on time
I_RTS_CTS   RTS on to CTS on time
I_RTS_ERR   RTS off while transmitting data
I_RTS_TD   RTS on to transmit data

SDLC tests

S_CNTERRS   Count DTE & DCE aborts & FCS errors - 60 min
S_CNTIVALL   Count DTE and DCE I-frames and all non I-frames -60 min
S_CTSTPRDC   Count DCE XIDs, SNRMs / DTE XIDs, UAs - 60 min
S_CTSTPRDT   Count DTE XIDs, SNRMs / DCE XIDs, UAs - 60 min
S_HILITFLG   Highlight flags on line
S_SNRM   Set leads on, send SNRM, beep on other than UA
S_UTIL   Measure half duplex BOP line utilization -10 min

Instrument setups

U_BURS_SPS   Setup for sync Burroughs poll select
U_BUR_A_PS   Setup for async Burroughs poll select
U_IPARS   Setup for common IPARS system
U-SYALL7   Setup to capture all bits on 7 bit sync link
U_SYALL8   Setup to capture all bits on 8 bit sync link
U_UNISCOPE   Setup for Uniscope sync link

X.25 tests

X_CALLTRYS	Count link attempts and irregular response
X_CNTALLFR	Count DTE + DCE SABM, UA, DISC, FRMR, RNR
X_CNTCALLS	Count DTE & DCE CALLs & CALL ACCEPTs -1 hr
X_CNTCONCT	Count DTE and DCE SABMs and UAs -60 min
X_CNTDCEFR	Count DCE SABM, UA, DISC, FRMR, RNR
X_CNTDCFRT	Count DCE SABM, UA, DISC, FRMR, - 60 min
X_CNTDTEFR	Count DTE SABM, UA, DISC, FRMR, RNR
X_CNTDTFRT	Count DTE SABM, UA, DISC, FRMR - 60 min
X_CNTERRS	Count DCE and DTE aborts and FCS errors - 60 min
X_CNTIVALL	Count DCE and DTE-I frames vs total frames - 10 min
X_DCEUTIL	DCE utilization - 10 min
X_DTEUTIL	DTE utilization - 10 min
X_HILITFLG	Highlight flags
X_LINKUPDN	Bring link up, then down, highlight errors
X_LVLI	Detect control lead and interface problems

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Installing Programs

Instructions for loading programs are presented in this section. Also covered are directions for copying the master disc, creating a customized test library, and instructions for printing programs.

Loading a Program from Disc

1. Insert the Data Communications Test Library or your customized test library disc (described on the next page) into the disc drive.

2. Press [MORE], then <Mass Store> to display the disc directory.

3. Use the arrow keys to select and highlight the program of your choice. A description of each test is included in the next section.

4. Press <Load>, then <Execute>. The program you chose is loaded. Press [Exit] to return to the top level. Press <Setup> to check or modify datacom link parameters. If you loaded a Monitor Program, press <Mon Menu> to view or modify it. If you loaded a Simulate Program, press <Sim Menu> to view or modify it.

5. To execute the program at the top menu level, press <Run Menn>, then <Monitor> or <Simulate>, depending on which type of test you loaded.

Copying the Master Disc

The master disc contains the Data Communications Test Library of programs. You must use the basic loading and storing features of the protocol analyzer to copy the programs to a work disc. If you have access to an HP 4952A Protocol Analyzer, and wish to copy the entire disc, you may use the "Copy Disc" utility supplied with the 4952A.

Hewlett-Packard recommends that you copy the programs that you will use from the master disc to a work disc. This disc will be called your "customized test library". New discs must be formatted before you can store on them.

Creating Your Customized Test Library

1. Insert your master disc (containing the sample programs) into the disc drive.

2. At the top level menu, press [MORE] and <Mass Store>. The disc is read and the directory of files on the disc is displayed.

3. Use the arrow keys to locate and highlight the first program you wish to load.

Note   The order in which you load the programs from the master disc to your customized test library disc will be the order in which they will appear on the disc.

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4. Press <Load> and <Execute>. The program is now in memory in the protocol analyzer. Datacom link parameters should be checked in the <Setup> menu and modified as needed.

5. If you wish to view or modify the program, follow steps a-d below; otherwise, go directly to step 6.

    a. Press [Exit].

    b. Press <Mon Menu> or <Sim Menu> (depending on which type of program you have loaded). Make any changes required to the program for your particular application.

c. Press [Exit].

d. From the top level menu, press [More], then <Mass Store>.

Note   Changing some parameters, such as Code, Mode, or Character Framing, may
               require corresponding changes to the monitor or simulate menus. Programs
               modified to take advantage of unique HP 4952A features may not run on the
               HP 4951C.

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6.   Press <Store>. Move the cursor to the File Name line and enter the name you wish
     to call this program. You may use the given default name if you wish. Be sure the
     File Type is "Menus".

7.   Remove the master disc and insert your customized test library disc into the disc
     drive.

8.   Press <Execute>. When the disc activity stops, the Mass Store menu will return.

Repeat steps 1 through 8 above until you have loaded all the programs you will need on your
customized test library disc.

Printing a Program

You may print program listings to help modify or understand a program. Do the following to
output a monitor (simulate) program listing to a printer.

Print setup - HP4951C

1.   Load the Print Application Program.

     a. From the top level menu, press [MORE], then <Mass Store>.

     b. Press [MORE], then <Print Appl>, then <Execute>.

2. Configure the Print Application Program.

    a. From the top level menu, press [MORE], then <Print>.

    b. Define the printer parameters.

Printing a Monitor (Simulate) Program - HP 4951C.

1. From the top level menu, press [MORE], then <Print>.

2. Select <Monitor> (<Simulate>), press <Execute>.

Print setup - HP 4952A

1. From the top level menu, press [MORE], then <Remote & Print>.

2. Press <Print Setup> and define the printer parameters.

3. Press the <Save Cnfg> key to save your printer configuration.

4. Press [EXIT] twice to return to the main level menu.

Printing a Monitor (Simulate) Program - HP 4952A

1. Load the program into the protocol analyzer.

2. Press the <Mon Menu> (<Sim Menu>) key.

3. Press [MORE] three times, then <Print Prog> to print the program to the printer.

Program Descriptions

All programs in this collection use the file name format defined here to aid in locating a desired program on a disc. The first letter of the file name indicates the program application listed in the following table.

A   General purpose asynchronous monitor programs
B   General purpose asynchronous simulate programs
C   Async terminal tests
D   Async printer tests
E   Test devices sending to async printers
F   Test async devices across a modem link
I   Interface tests (level 1)
S   SDLC tests
U   Instrument setups
X   X.25 tests

Note   Program names appear in the upper right hand corner on the following program description pages.

PROGRAM PURPOSE: Count DCE and DTE characters for 1 minute (or 10 minutes). Useful for checking link throughput, file sizes, etc.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, parity, etc.
2. "Don't Care" characters in Block 2 may be replaced by any desired character string.
3. "Stop Tests" in Block 9 may be removed for 10 minute operation, with minutes counted in counter 1.
4. The first counter 1 test value in Block 9 may be replaced by any desired (minutes - 1) value for different test duration.

Note that high line utilization above 9600 bps may cause the analyzer's buffer to overflow, returning the instrument to top level.

RESULTS:

Counter 1: Minutes of test
Counter 2: DTE characters x 1
Counter 3: DTE characters / 1000
Counter 4: DCE characters x 1
Counter 5: DCE characters / 1000

Timer 1: Milliseconds of test

$$\text{DTE chars/sec} = \frac{(\text{Counter 3} \times 1000) + \text{Counter 2}}{(\text{Counter 1} \times 60) + \text{Timer 1}/1000}$$

$$\text{DCE chars/sec} = \frac{(\text{Counter 5} \times 1000) + \text{Counter 4}}{(\text{Counter 1} \times 60) + \text{Timer 1}/1000}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Count DCE and DTE parity errors for 60 seconds (or ten minutes). Parity errors indicate a link problem.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, parity, etc.
2. "Stop Tests" in Block 9 may be removed for 10 minute operation, with minutes counted in counter 1.
3. The first counter 1 test value in Block 9 may be replaced by any desired (minutes - 1) value for other test durations.

RESULTS:

Counter 1: Minutes of test
Counter 2: DTE parity errors x 1
Counter 3: DTE parity errors / 1000
Counter 4: DCE parity errors x 1
Counter 5: DCE parity errors / 1000

Timer 1: Milliseconds of test

$$\text{DTE parity errors/sec} = \frac{(\text{Counter 3} \times 1000) + \text{Counter 2}}{(\text{Counter 1} \times 60) + \text{Timer 1}/1000}$$

$$\text{DCE parity errors/sec} = \frac{(\text{Counter 5} \times 1000) + \text{Counter 4}}{(\text{Counter 1} \times 60) + \text{Timer 1}/1000}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   **PROGRAM NAME: B_ASC7EVER**

PROGRAM PURPOSE: Continuously send ASCII 7 even parity string in which all "R"s have errored parity. Useful for testing device response to parity errors.

OPERATING INSTRUCTIONS: Run simulate

1.   Check Setup Menu for proper bit rate.
2.   Test sends as DCE; may be changed in Simulate Menu to DTE.

RESULTS:

All transmitted "R"s have parity errors.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION:(06-25-87)   PROGRAM NAME: B_ASC7ODER

PROGRAM PURPOSE: Continuously send ASCII 7 odd parity string in which all "R"s have
errored parity. Useful for testing device response to parity errors.

OPERATING INSTRUCTIONS: Run Simulate

   1.   Check Setup Menu for proper bit rate.
   2.   Test sends as DCE; may be changed in Simulate Menu to DTE.

RESULTS:

All transmitted "R"s have parity errors.

Unlisted Counters and Timers may be used in the program, but their contents have no user
meaning.

REVISION: (06-25-87)   PROGRAM NAME: B_AUTOBAUD

PROGRAM PURPOSE: Send string so that terminal or printer's configured bit rate will appear on tested device. Useful for determining async device speed. Identifies 1200, 2400, 9600, 19200 devices.

OPERATING INSTRUCTIONS: Run simulate

 Test sends as DCE; may be changed in Simulate Menu to DTE.

RESULTS:

Bit rate of tested device will appear on device.

Note that this test was written for 8 bit ASCII and may not work with 7 bit ASCII data codes.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Continuously send 81-character string with both Xon/Xoff and DTR flow control. Useful for exercising terminals, printers, and other devices. Lost or errored characters are easily detected visually.

OPERATING INSTRUCTIONS: Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DCE; may be changed in Simulate Menu to DTE.

Note that this program sends no carriage-return/line feed and assumes that continuous character strings will be automatically "wrapped" at the end of each line by the device under test.

RESULTS:

81-character "stair-step" pattern appears on printer or terminal. This pattern is very visually distinctive; errored or lost characters may be detected visually.

Unlisted Counters and Timers may be used in the program, but their contents have no meaning.

REVISION: (06-25-87)   PROGRAM NAME: B_BRBRPOLS

PROGRAM PURPOSE: Send approximately 4 pages of an 81-character string with both Xon/Xoff and DTR flow control. Useful for exercising terminals, printers and other devices. Lost or errored characters are easily detected visually.

OPERATING INSTRUCTIONS: Run Simulate

1.   Check Setup Menu for proper bit rate, parity, etc.
2.   Test sends as DCE; may be changed in Simulate Menu to DTE.

Note that this program sends no carriage-return/line feed and assumes that continuous character strings will be automatically "wrapped" at the end of each line by the device under test.

RESULTS:

81-character "stair-step" pattern appears on printer or terminal. This pattern is very visually distinctive; errored or lost characters may be detected visually.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: B_FOXFLOW

PROGRAM PURPOSE: Send QUICK BROWN FOX message with Xon/Xoff and DTR
flow control continuously. Useful for exercising terminals, printers, and other devices. Lost or
errored characters are easily detected visually.

OPERATING INSTRUCTIONS: Run Simulate

1.   Check Setup Menu for proper bit rate, parity, etc.
2.   Test sends as DCE; may be changed in Simulate Menu to DTE.

RESULTS:

QUICK BROWN FOX message sent to terminal or printer. This pattern is very visually
distinctive; errored or lost characters may be visually detected.

Unlisted Counters and Timers may be used in the program, but their contents have no user
meaning.

REVISION: (06-25-87)   PROGRAM NAME: C_ALGNMNT

PROGRAM PURPOSE: Send "cross-hair in square" pattern for terminal display alignment.

OPERATING INSTRUCTIONS: Run Simulate

    1.   Check Setup Menu for proper bit rate, parity, etc.
    2.   Test sends as DCE; may be changed in Simulate Menu to DTE.

RESULTS:

"Cross-hair in square" pattern on terminal display.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Measure average and instantaneous response time from DTE carriage-return to DCE prompt. Response time is a key indicator of system loading problems or link errors, and is a major contribution to user dissatisfaction.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test assumes terminal is DTE, host is DCE, carriage-return from terminal gets carriage-return or line-feed, then any prompt character from host.
3. Press Return on terminal as many times as desired.

RESULTS:

Counter 1: Number of responses
Counter 2: Minutes total resp time

Timer 1: Last response time
Timer 2: mSec total response time

$$\text{Average response time per/sec} = \frac{(\text{Counter } 2 \times 60 + \text{Timer } 2/1000)}{\text{Counter } 1}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   **PROGRAM NAME: D_BUFFER**

PROGRAM PURPOSE: Determine printer buffer characteristics.

PROGRAM DESCRIPTION: Send Xs until Xoff or DTR off, then 60-character string to
visually determine printer buffer after Xoff or DTR off. Incompatibilities between the printer
buffer and the sending device flow control response may cause lost characters on printouts.

OPERATING INSTRUCTIONS: Run Simulate

1.   Check Setup Menu for proper bit rate, parity, etc.
2.   Test sends as DCE; may be changed in Simulate Menu to DTE.

Note that this program sends no carriage-return/line feed and assumes that continuous
character strings will be automatically "wrapped" at the end of each line by the device under
test.

RESULTS:

Counter 1: Characters before first flow off
Counter 2: Characters between flow on/off
Counter 3: Number of flow off/on cycles

Printer will print X until it sends a flow off (Xoff or DTR off), then
"123456789A123456789B123456789C123456789D123456789E123456789" is sent to the printer.
The number of characters of this string that are printed indicates the printer's buffer size after
flow off.

Unlisted Counters and Timers may be used in the program, but their contents have no user
meaning.

REVISION: (06-25-87)   PROGRAM NAME: D_DTR

PROGRAM PURPOSE: Exercise a printer with DTR flow control. Program sends 78-character lines of X with carriage return/line feed at the end of each line. See also General purpose async simulate programs.

OPERATING INSTRUCTIONS: Run Simulate

1.   Check Setup Menu for proper bit rate, parity, etc.
2.   Test sends as DCE; may be changed in Simulate Menu to DTE.

RESULTS:

Continuous display of 78-character lines of X.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Exercise a printer with Xon/Xoff flow control. Program sends 78-character lines of X with carriage return/line feed at end of each line. See also General purpose async simulate programs.

OPERATING INSTRUCTIONS: Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DCE; may be changed in Simulate Menu to DTE.

RESULTS:

Continuous display of 78-character lines of X.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: E_DTRFLOW

PROGRAM PURPOSE: Test devices sending to printers with DTR control. Determine how many characters device sends after DTR off. Incompatibilities between the printer buffer and the sending device flow control response may cause lost characters on printouts.

OPERATING INSTRUCTIONS: Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DTE; may be changed in Simulate Menu to DCE.
3. Send large file from host as if printing.

RESULTS:
Counter 2: Number of DTR cycles
Counter 3: Total chars sent with/DTR off

$$\text{Average characters sent with DTR off} = \frac{\text{Counter 3}}{\text{Counter 2}}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Test devices sending to printers with XON/XOFF control. Find how many characters device sends after Xoff. Incompatibilities between the printer buffer and the sending device flow control response may cause lost characters on printouts.

OPERATING INSTRUCTIONS: Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DTE; may be changed in Simulate Menu to DCE.
3. Send large file from host as if printing.

RESULTS:

Counter 2: Number of Xon/Xoff cycles.
Counter 3: Total characters sent after Xoff.

$$\text{Average characters sent after Xoff} = \frac{\text{Counter 3}}{\text{Counter 2}}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: F_BRBRPOLS

PROGRAM PURPOSE: Send 81-character string with both Xon/off and CTS flow control, (approximately 4 pages). This is useful for testing printers or other devices across modem links. Lost or errored characters are easily detected visually.

OPERATING INSTRUCTIONS: Run Simulate

1.   Check Setup Menu for proper bit rate, parity, etc.
2.   Test sends as DTE.
3.   Test expects DSR, CD, and CTS to be high, but beeps if low.
4.   Terminal emulator may be used to dial link.

Note that this program sends no carriage-return/line feed and assnmes that continuous character strings will be automatically "wrapped" at the end of each line by the device under test.

RESULTS:

81-character "stair-step pattern appears on the printer or terminal at the other end of modem link.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Determine printer buffer characteristics across the modem link. Incompatibilities between the printer buffer and the sending device flow control response may cause lost characters on printouts.

PROGRAM DESCRIPTION: Send Xs until Xoff or CTS off, then 60-character string to visually determine printer buffer after Xoff or CTS off.

OPERATING INSTRUCTIONS: Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DTE; may be changed in Simulate Menu to DCE.
3. Test expects DSR, CD, and CTS high, but will beep if they are not.
4. Test raises DTR,RTS.
5. Link may be dialed using terminal emulator.

Note that this program sends no carriage-return/line feed and assumes that continuous character strings will be automatically "wrapped" at the end of each line by the device under test.

RESULTS:

Counter 1: Characters before first flow off
Counter 2: Characters between flow on/off
Counter 3: Number of flow off/on cycles

Printer will print X until it sends a flow off (Xoff or DTR off) then "123456789A123456789B123456789C123456789D123456789E123456789" is sent to the printer. The number of characters of this string that are printed indicates the printer's buffer size after flow TSoff.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87   PROGRAM NAME: I_AVRTSCTS

PROGRAM PURPOSE: Measure average RTS to CTS time for 10 intervals. On half duplex systems, RTS to CTS delay is one major factor in link efficiency. Longer time reduces throughput, shorter time increases error probability.

OPERATING INSTRUCTIONS: Run Monitor

    1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Counter 1: Number of RTD to CTS periods

Timer 1: Total RTS to CTS time

$$\text{Average RTS to CTS time} = \frac{\text{Timer 1}}{\text{Counter 1}}$$

Transitions are highlighted in the data and state display.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Measure average remote turn-around time (RTS off to CD on) on half duplex link for 5 turn-arounds. Link efficiency is highly affected by turn-around time. Longer time decreases throughput, shorter time increases error probability.

OPERATING INSTRUCTIONS: Run Monitor

    1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Counter 1: Number of turn-arounds

Timer 1: Total turn-around time

$$\text{Average turn-around time} = \frac{\text{Timer 1}}{\text{Counter 1}}$$

Transitions are highlighted in the data and state display.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: I_CDOFF

PROGRAM PURPOSE: Check if CD is off while data is being received. In most systems, CD should be on when receiving data.

OPERATING INSTRUCTIONS: Run Monitor

1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Counter 1: Number of characters with Cd off

Characters received with CD off are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   **PROGRAM NAME: I_CD_TO_RD**

PROGRAM PURPOSE: Measures time from CD on to received data on half duplex system. Longer time delay reduces throughput, shorter time delay increases error probability.

OPERATING INSTRUCTIONS: Run Monitor

    1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Timer 1: CD on to received data time

Lead transition and first received character are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: I_CD_TO_TD

PROGRAM PURPOSE: Measure time from CD off to transmitted data on half duplex system. Longer time delay reduces throughput, shorter time delay increases error probability.

OPERATING INSTRUCTIONS: Run Monitor

1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Timer 1: CD off to transmitted data time

Lead transition and first received character are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: I_CTSTD

PROGRAM PURPOSE: Measure time from CTS on to transmitted data on half duplex
system. Longer time delay reduces throughput, shorter time delay increases error probability.

OPERATING INSTRUCTIONS: Run Monitor

1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Timer 1: CTS on to transmitted data time

Lead transition and first received character are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user
meaning.

REVISION: (06-25-87)   PROGRAM NAME: I_CTS_ERR

PROGRAM PURPOSE: Detect CTS drop before RTS to indicate link or modem problem.

OPERATING INSTRUCTIONS: Run Monitor

   1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Counter 1: Number of illegal transitions

Illegal lead transitions are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: I_DSR_DTR

PROGRAM PURPOSE: Detect transitions and glitches on DSR and DTR. In modem link, these leads should generally stay on. Detect "on" to "off" transitions.

OPERATING INSTRUCTIONS: Run Monitor

    1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Counter 1: DTR transitions
Counter 2: DSR transitions

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: I_LCLTURND

PROGRAM PURPOSE: Measure local turn-around (Cd off to TRS on) on half duplex system. Longer time delay reduces throughput, shorter time delay increases error probability.

OPERATING INSTRUCTIONS: Run Monitor

   1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Timer 1: Turn-around time

Lead transitions are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   **PROGRAM NAME: I_RMT_TRND**

PROGRAM PURPOSE: Measure time from RTS off to CD on in half duplex system and number of polls before a response. Longer time dely reduces throughput, and shorter time delay increases error probability.

OPERATING INSTRUCTIONS: Run Monitor

   1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Counter 1: Number of polls

Timer 1: First RTS off to Cd on
Timer 2: Last poll RTS off to CD on

Lead transitions are highlighted.
If there is only one poll, time measurement is in Timer 1.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: I_RTS_CTS

PROGRAM PURPOSE: Measure time from RTS on to CTS on in half duplex system and number of polls before a response. Longer time dely reduces throughput, shorter time delay increases error probability.

OPERATING INSTRUCTIONS: Run Monitor

1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Timer 1: First RTS on to CTS on

Lead transitions are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: I_RTS_ERR

PROGRAM PURPOSE: Detect RTS off while transmitting data. RTS off while DTE is transmitting indicates DTE problem.

OPERATING INSTRUCTIONS: Run Monitor

    1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Counter 1: Number of characters with RTS off

Characters with RTS off are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Measure time from RTS on to transmitted data. Longer time delay reduces throughput, shorter time delay increases error probability.

OPERATING INSTRUCTIONS: Run Monitor

1.   Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Timer 1: Time from RTS on to transmitted data

Lead transitions and characters are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Count DCE and DTE aborts and FCS errors for 60 minutes.
Aborts may indicate DTE problems, FCS error may indicate link problems.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   Test duration may be changed from 60 minutes by changing the statement in Block 3,
     "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test
Counter 2: DTE aborts
Counter 3: DCE aborts
Counter 4: DTE FCS errors
Counter 5: DCE FCS errors

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user
meaning.

REVISION: (06-25-87)   PROGRAM NAME: S_CNTIVALL

PROGRAM PURPOSE: Count DCE/DTE I frames- and all non I-frames for 60 minutes.
System throughput increases with the number of I frames per total frames.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   Test duration may be changed from 60 minutes by changing the statement in Block 3,
     "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test
Counter 2: DTE all non I-frames
Counter 3: DTE I-frames
Counter 4: DCE all non I-frames
Counter 5: DCE I-frames

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user
meaning.

PROGRAM PURPOSE: Count DCE XIDs SNRMs / DTE XIDs, UAs for 60 minutes. This test assumes primary (host) is DCE.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test
Counter 2: DCE XIDs
Counter 3: DTE XIDs
Counter 4: DCE SNRMs
Counter 5: DTE UAs

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Count DTE XIDs SNRMs / DCE XIDs, UAs for 60 minutes. This test assumes primary (host) is DTE.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test
Counter 2: DTE XIDs
Counter 3: DCE XIDs
Counter 4: DTE SNRMs
Counter 5: DCE UAs

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Highlight and capture/display only flags on line. Absence of flags indicates inactive device.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.

RESULTS:

Flags (hex 7E) are highlighted in buffer.
Only flags are captured or displayed.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Set leads on, send SNRM, beep on receipt of other than UA, indicating error on part of secondary. This test assumes primary (host) as DCE.

OPERATING INSTRUCTIONS: Run Simulate

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   Timeout of 3000 ms may be changed in Timer 1 test in Block 1.

RESULTS:

Beep on timeout (3000 ms) or response other than UA.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: S_UTIL

PROGRAM PURPOSE: Measure half duplex bit oriented protocol line utilization for 10 minutes.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 10 minutes by changing the statement in Block 3, "If Counter 1 >9".

RESULTS:

Counter 1: Minutes of test
Counter 2: Minutes used by DTEs
Counter 3: Minutes use by DCE

Timer 1: mSec of test
Timer 2: mSec used by DTE
Timer 3: mSec used by DCE

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: U_BURS_SPS

PROGRAM PURPOSE: Setup for synchronous Burroughs poll/select link.

REVISION: (06-25-87)   PROGRAM NAME: U_BUR_A_PS

PROGRAM PURPOSE: Setup for asynchronous Burroughs poll/select link.

REVISION: (06-25-87)   PROGRAM NAME: U_IPARS

PROGRAM PURPOSE: Setup for common IPARS system.

REVISION: (06-25-87)   PROGRAM NAME: U_SYALL7

PROGRAM PURPOSE: Setup to capture all bits on 7-bit framed synchronous link. Useful
for preliminary analysis of unknown or disfunctional protocol. To maximize buffer utilization,
Hewlett-Packard protocol analyzers do not store some data, i.e. bits between frames in bit-
oriented setups.

REVISION: (06-25-87)   PROGRAM NAME: U_SYALL8

PROGRAM PURPOSE: Setup to capture all bits on 8-bit framed synchronous link. Useful
for preliminary analysis of unknown or disfunctional protocol. To maximize buffer utilization,
Hewlett-Packard protocol analyzers do not store some data, i.e. bits between frames in bit-
oriented setups.

REVISION: (06-25-87)   PROGRAM NAME: U_UNISCOPE

PROGRAM PURPOSE: Setup for Uniscope synchronous link.

PROGRAM PURPOSE: Detect and count link attempts and irregular responses. Irregular response to SABM includes non-UA and non-SABM frames from either side and timeouts. Irregular responses are highlighted. Test duration is 60 minutes.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test
Counter 2: DTE link attempts (SABMs)
Counter 3: Irregular response to DTE
Counter 4: DCE link attempts (SABMs)
Counter 5: Irregular response to DCE

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: X_CNTALLFR

PROGRAM PURPOSE: Count DTE plus DCE total (SABMs, UAs, DISCs, FRMRs, and RNRs). In general, all these numbers should be low.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   This test **must** be stopped manually [HALT/EXIT].

RESULTS:

Counter 1: (DCE & DTE) total SABMs
Counter 2: (DCE & DTE) total UAs
Counter 3: (DCE & DTE) total DISCs
Counter 4: (DCE & DTE) total FRMRs
Counter 5: (DCE & DTE) total RNRs

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Count DTE and DCE CALLS and CALL ACCEPTs for 60 minutes. Difference between number of CALLS and CALL ACCEPTs on either side indicates unsuccessful CALLS.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test
Counter 2: DTE CALLS
Counter 3: DCE CALL ACCEPTs
Counter 4: DCE CALLS
Counter 5: DTE CALL ACCEPTs

Timer 1: mSec of test

In general, on an X.25 link, the count in counter 2 should be close to the count in counter 3, and the count in counter 4 should be close to the count in counter 5.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Count DTE and DCE SABMs and UAs for 60 minutes. Number of SABMs and UAs should be close to each other, and low for each side.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test
Counter 2: DTE SABMs
Counter 3: DCE UAs
Counter 4: DCE SABMs
Counter 5: DTE UAs

Timer 1: mSec of test

In general, on an HDLC (X.25) link, the count in counter 2 should be close to the count in counter3, and the count in counter 4 should be close to the count in counter 5.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: X_CNTDCEFR

PROGRAM PURPOSE: Count DCE SABM, UA, DISC, FRMR, and RNR. In general, all should be fairly low numbers.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   This test **must** be stopped manually [HALT/EXIT].

RESULTS:

Counter 1: DCE SABMs
Counter 2: DCE UAs
Counter 3: DCE DISCs
Counter 4: DCE FRMRs
Counter 5: DCE RNRs

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: X_CNTDCFRT

PROGRAM PURPOSE: Count DCE SABM, UA, DISC, FRMR for 60 minutes. In general, all should be fairly low numbers.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 . 59".

RESULTS:

Counter 1: Minutes of test
Counter 2: DCE SABMs
Counter 3: DCE UAs
Counter 4: DCE DISCs
Counter 5: DCE FRMRs

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Count DTE SABM, UA, DISC, FRMR and RNR. In general, all should be fairly low numbers.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   This test **must** be stopped manually [HALT/EXIT].

RESULTS:

Counter 1: DTE SABMs
Counter 2: DTE UAs
Counter 3: DTE DISCS
Counter 4: DTE FRMRs
Counter 5: DTE RNRs

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: X_CNTDTFRT

PROGRAM PURPOSE: Count DTE SABM, UA, DISC, FRMR for 60 minutes. In general, all should be fairly low numbers.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   Test duration may be changed from 60 minutes by changing the statement in Block 3 "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test
Counter 2: DTE SABMs
Counter 3: DTE UAs
Counter 4: DTE DISCs
Counter 5: DTE FRMRs

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

PROGRAM PURPOSE: Count DCE and DTE aborts and FCS errors for 60 minutes.
Aborts may indicate DTE problems, FCS error may indicate link problems.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3,
    "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test
Counter 2: DTE aborts
Counter 3: DCE aborts
Counter 4: DTE FCS errors
Counter 5: DCE FCS errors

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user
meaning.

REVISION: (06-25-87)   PROGRAM NAME: X_CNTIVALL

PROGRAM PURPOSE: Count DCE/DTE I frames vs total frames. System throughput
increases with the number of I frames per total frames. Test duration is 60 minutes.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   Test duration may be changed from 60 minutes by changing the statement in Block 3,
      "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test
Counter 2: DTE all frames
Counter 3: DTE I-frames
Counter 4: DCE all frames
Counter 5: DCE I-frames

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user
meaning.

REVISION: (06-25-87)   PROGRAM NAME: X_DCEUTIL

PROGRAM PURPOSE: Measure full duplex DCE side bit-oriented protocol line utilization for 10 minutes.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1.   Check Setup Menu for proper bit rate, clock sources, etc.
2.   Test duration may be changed from 10 minutes by changing the statement in Block 3, "If Counter 1 > 9".

RESULTS:

Counter 1: Minutes of test
Counter 2: DCE utilized minutes

Timer 1: mSec of test
Timer 2: mSec utilized DCE

$$DCE\ utilization = \frac{Counter\ 2\ x\ 60\ +\ Timer\ 2\ x\ 1000}{Counter\ 1\ x\ 60\ +\ Timer\ 1\ x\ 1000}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: X_DTEUTIL

PROGRAM PURPOSE: Measure full duplex DTE side Bit-Oriented Protocol line utilization for 10 minutes.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 10 minutes (D-1=9) in first counter limit of Block 3.

RESULTS:

Counter 1: Minutes of test
Counter 2: DTE utilized minutes

Timer 1: mSec of test
Timer 2: mSec utilized DTE

$$\text{DTE utilization} = \frac{\text{Counter 2 x 60 + Timer 2 x 1000}}{\text{Counter 1 x 60 + Timer 1 x 1000}}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   **PROGRAM NAME: X_HILITFLG**

PROGRAM PURPOSE: Highlight and capture/display only flags on line. Absence of flags indicates inactive device.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

    1.   Check Setup Menu for proper bit rate, clock sources, etc.

RESULTS:

Flags (hex 7E) are highlighted in buffer.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   PROGRAM NAME: X_LINKUPDN

PROGRAM PURPOSE: Bring link up, then down, "beep" and highlight errors.

OPERATING INSTRUCTIONS: Run Simulate

    1.   Check Setup Menu for proper bit rate, clock sources, etc.
    2.   Test is DTE.

RESULTS:

Leads not up, or improper response to SABM, are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)   **PROGRAM NAME: X_LVLI**

PROGRAM PURPOSE: Detect control lead and interface problems.

OPERATING INSTRUCTIONS:

1. Connect analyzer to X.25 link that should be active.
2. Run monitor program.
3. DTE clock is expected to be supplied by the DCE; it may be changed in the setup menu.

RESULTS:

1. No beep indicates all needed leads are high, and presence of flags with clock on both sides of the line.
2. If DSR, CD, or CTS is not high (DCE leads), counter 1 is set to 1 and the analyzer beeps.
3. If DTR or RTS is not high (DTE leads), counter 1 is set to 2 and the analyzer beeps.
4. If no flags are present on the DCE side (pin 3), counter 2 is set to 1 and the analyzer beeps.
5. If no flags are present on the DTE side (pin 2), counter 2 is set to 2 and the analyzer beeps.
6. If flags are not present on either side, check for clocks on POD on pins 15 and 17, or on pin 24 if DTE supplies its own clock.

Counter 1 or 2: value of 1 indicates a modem problem.
Counter 1 or 2: value of 2 indicates a terminal problem.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

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Alphabetically by Country

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